

USE OF INJECTION WELLS FOR REFINERY WASTE DISPOSAL

Quarterly Technical Report

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Objectives

The Ground Water Protection Council (GWPC) has had initial discussions with the American Petroleum Institute staff and several major oil companies concerning a project that would address several technical and regulatory issues related to the use of injection wells at refineries. All parties believe that this project has significant potential to save millions of dollars in operational costs by streamlining and improving both state and federal UIC regulations which are now overly redundant and not risk-based.

As currently regulated by the United States Environmental Protection Agency (USEPA), injection wells used for refinery related disposal are typically classified as either Class I hazardous or non-hazardous, depending on RCRA classification. The expense of acquiring an operating permit for these types of wells is very high and they have substantially more operational expenses than a typical Class II injection well. The combination of permitting requirements (including a “no-migration” petition), stringent construction requirements, and intensive monitoring and reporting requirements often make these wells uneconomical for otherwise legitimate waste disposal purposes.

What is perplexing, based on general observation, is that some Class II injection wells are being permitted and allowed to dispose of wastes having similar characteristics as some of those used by the refineries but classified as hazardous. Class II injection wells are authorized statutorily because the injectate is associated with fluids originating from the production of hydrocarbons. From our conversations with several state oil and gas regulatory agencies and representatives of the refinery industry, it appears that the use of Class II wells at refineries has been rejected because they are not seen as being directly associated with the production of oil & gas. Examples of such refinery wastes are those associated with various treatment or process streams originating from the plant. Although these wastes are associated with produced hydrocarbons, USEPA does not consider them to be in the same category as wastes associated with Class II injection wells, even if they are characteristically similar.

This project would collect sufficient data to determine whether or not (in relation to the underlying regulations) there is an inconsistency in current federal and state regulation. If one is found, refineries might be eligible for a reclassification of wastes.

This project could result in a modification of these wells’ classification given the fact that the GWPC through its state members and USEPA have resolved similar issues in the past. One example is the USEPA modified rules so that waste fluids (brines) brought to the surface as a result of gas storage operations could be exempted under the RCRA program’s hazardous waste exemption. This determination essentially said that these fluids could be defined as being associated with the initial production of hydrocarbons. In another example some states have made UIC program decisions, in turn approved by USEPA, that wells used to dispose of non-hazardous fluids associated with oil & gas enhanced recovery equipment maintenance could be disposed via a Class II injection well.

These are not accomplishments that can easily, if at all, be done by the regulated industry. These are functions of the state and federal government. Subsequently, it takes a state regulating group like GWPC, with assistance from DOE to do the work.

Summary Of Technical Progress

- Task 1 **Characterize the Various Wastes that are Produced at a Sample of Refineries.** The refining industry, as well as, USEPA has been actively attempting to characterize these wastes. This project will allow the use of existing records that have been accepted by both parties.
- Task 2 **Correlate Waste Types with the Current Disposal Mechanisms and Desired Disposal Mechanisms.** This will require discussion with selected refineries most interested in utilizing underground injection to thoroughly assess and analyze waste characterization and disposal mechanisms. The characteristics of these wastes will then need to be compared to waste characteristics common to Class II injection wells.
- Task 3 **Assess Disposal Options.** This task will involve a study of the feasibility of using Class I injection wells (hazardous vs non-hazardous), Class II injection wells, modifying regulations for the development of a well class or modifying existing well classification restrictions. The objective of this effort will be to delineate the most cost effective possibilities, some of which may require modifications to existing underground injection control regulations at the federal level.
- Task 4 **Prepare Final Report.** The final report will summarize the objectives of this effort, the waste characterization and existing disposal methods assessment, and the feasibility of potential alternatives.

Summary of Progress:

- Members of the project team developed a simplified questionnaire and have distributed it to the 67 member company representatives of the Environmental Committee of the National Petroleum Refiners Association in December, 1996. Attachment A is a copy of the letter and questionnaire.
- Work has continued on the accumulation of background material which is needed to identify barriers to developing a different classification for these refinery wastes. Work to date has indicated some lack of acceptance on the part of state regulators to change the current well classification process. Some do not want to open discussion on a regulatory system of long standing and maturity and one they believe is working. Project consultant, Bill Bryson, has been meeting with individual state regulatory officials.

Attachment A

Letter & Questionnaire Sent to the Members of the Environmental
Committee of the National Petroleum Refiners Association

December 11, 1996

(Address)

Subject:

Dear:

The Ground Water Protection Council has begun a study related to the costs and regulatory requirements associated with injecting selected non-hazardous liquid waste streams produced during petroleum refining processes into deep disposal wells. These activities would be those associated with the construction, siting, monitoring and sampling frequency of injected non-hazardous waste streams and well closure and abandonment (plugging) which appear to be a disincentive for considering injection well technology as a viable waste management option.

Several trends in environmental regulation have occurred over the last two years which makes revisiting the potential for the use of deep wells to inject refinery waste desirable:

- (1) Some oil companies with refineries have expressed concern over the cost and rigor of Class I monitoring and waste stream sample collection and analysis frequency as compared with non-hazardous and exempt Class II waste which has the same low potential for environmental harm.
- (2) In 1994, the Clinton Administration developed a series of Common Sense Initiatives to look at the cost effectiveness and substance of environmental regulation. One of the main discussion groups was refinery waste. Concurrently, Congress developed its own versions of regulatory reform and reinvention and many states followed suit by passing statutes which made state environmental agencies review all newly proposed environmental regulations for cost versus benefit. A few governors required this review to extend to existing regulations.
- (3) Injection of non-hazardous, and for that matter, hazardous waste, is a viable technology but has not always been viewed as such by the environmental community. Those environmentalists who have since become concerned over the long term impact of activities such as treated surface discharge of non-hazardous refinery waste, and land treatment and burial, are again viewing properly controlled and regulated injection as a valid option.

The purpose of this study is to provide guidance and counsel to the USEPA, and state UIC program regulators, who desire to determine whether certain non-hazardous liquid refinery waste streams, if injected, should be governed by a more cost effective set of regulations than is currently in force. This study is not intended to suggest that a refinery which currently does not inject refinery waste at any location within the U.S. should use that option and discontinue a company waste management program of source reduction, water treatment, pretreatment or recycling which precluded the need for considering injection. In addition, deep well injection may be an infeasible alternative at some refinery locations due to unfavorable subsurface geology, unstable tectonic situations or insurmountable public opinion. The study results, if acted on as a positive set of regulatory alternatives to other waste management options, may allow a refinery to explore the potential of using injection with a set of environmental risk/cost benefit parameters that were not available when the Class I UIC state and federal regulatory programs were promulgated in the early-mid 1980's.

We are enclosing a short questionnaire which is relevant to the issues embodied in this study and which have been raised by some refiners who use injection wells or would use wells if the requirements were, in their view less onerous. The questionnaire is short because we realize all companies are besieged with requests for information and everyone's time is limited. We would like to have the completed questionnaire and any other perspectives you are willing to share by January 10, 1997.

The Groundwater Protection Council is sponsoring a two day forum in Houston, Texas on January 15 and 16, 1997 and the issues covered in this questionnaire will be discussed in terms of policy and substance. We have enclosed a tentative agenda if someone from your company is interested in attending. Thank you in advance for your help on this study. Please send all completed questionnaires and any other materials or points of discussion you believe advantageous to our effort to William R. Bryson at the address listed below. Please feel free to call me at (913)-842-8250 or Mike Paque, GWPC Executive Director at 405/848-0690.

Very sincerely yours,

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INJECTION WELL CLASSIFICATION FOR OIL & GAS PRODUCTION AND REFINING

Injection wells are used to the exclusion of other types of liquid waste management options in petroleum production activities. The produced brines, when brought to the surface during the production of oil and gas are not conducive to cost effective treatment to reduce mineralization concentration of the brine nor to strip off the very small concentration of Volatile Organic Compounds (VOC's) remaining in the waste stream after crude oil separation. Under the classification system established by regulation in the early 1980's by the U.S. Environmental Protection Agency, produced water from petroleum production either disposed of or injected into oil producing formations for enhanced recovery, were grouped into Class II of the Underground Injection Control (UIC) Program.

Under the same classification system, non-hazardous waste streams produced during refining were required to be injected into Class I disposal wells even where the physical and chemical character and composition of the waste was similar, or in many cases less toxic than oil field brine. Class I injection wells are subjected to a stricter and more intensive set of regulatory requirements than most other types of injection wells, including those receiving oil field produced waters.

QUESTIONNAIRE

1. Are injection wells part of your liquid waste management program at oil refinery locations or satellite facilities (pipeline or vehicle washing stations)

YES _____ NO _____

If the answer is NO, please skip to question #5.

2. If answer to #1 is yes, please specify which locations (please list) by refinery location: address, city, state.

3. At locations listed in question #2, please provide a list of waste streams injected and indicate whether these have been classified as hazardous or non-hazardous by EPA or the appropriate state regulatory agency. If a representative chemical analysis of the injectate is available, please attach a copy. Include any wells used as a part of ground water contamination cleanup at current or past refinery sites.

4. If you have been using injection wells as a part of your waste management program, have you recently been required by EPA or state regulatory agency to reclassify previously non-hazardous wastes as hazardous under the Land Ban regulations.

YES_____ NO_____

COMMENTS:

5. If the answer to Question #1 was NO, please indicate the reasons for not using injection technology. Check all that apply and comment if you wish.

- (a) Company policy to not use injection
- (b) Used injection wells at one time but discontinued in favor of other principles of waste hierarchy i.e. source reduction, recycling, treatment.
- (c) Unfavorable state regulatory attitude toward injection.
- (d) Unfavorable subsurface geology or tectonic conditions. (Seismic activity, no available injection zone, etc.
- (e) Other

6. If State or Federal (EPA) Regulatory Requirements were reshaped to account for environmental benefit versus cost increment, would injection technology be considered for your non-hazardous waste stream?

YES_____ NO_____

7. Any other comments on this study you would like to make?

8. Would you like a copy of the study results when finalized and cleared for distribution?

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